



Sudan University of Science and  
Technology  
College of Graduate Studies



**Hardness Enhancement of Human Teeth Filler  
(Amalgam) Using Low Level Laser**

زيادة صلادة حشوة الأسنان (الأملمغم) باستخدام ليزر منخفض  
القدرة

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سُورَةُ الْفَاتِحَةِ

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ

الرَّحْمَنِ الرَّحِيمِ

إِيتَاكَ تَعْبُدُ وَإِيَّاكَ تَسْتَعِينُ

الضَّرَاطُ الْمُسْتَقِيمَ

صِرَاطَ الَّذِينَ أَنْعَمْتَ

عَلَيْهِمْ غَيْرِ الْمَغْضُوبِ عَلَيْهِمْ

وَلَا الضَّالِّينَ

## ***Dedication***

*I dedicate this humble work to Cindy in this life who has great heart to my father.*

*To who gave me love and affection to the symbol of love and balm healing to pure and white heart (my mother).*

*To the innocent hearts and innocent souls to my sisters and my dear brother.*

*To my fellow students and all who contributed this work.*

*To my supervisor.*

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# Contents

## Chapter One

### Introduction and Basic Concepts

1.1 Introduction.....	1
1.2 Aim of this work.....	2
1.3 Thesis structure.....	2
1.4 Principle and construction of lasers.....	2
1.5 Characteristics of laser light.....	3
1.5.1 Monochromaticity.....	4
1.5.2 Directionality.....	4
1.5.3 Coherence.....	5
1.5.4 Brightness.....	6
1.5.5 Focusing of laser beam.....	6
1.6 Type of lasers.....	7
1.6.1 Gas laser.....	7
1.6.2 Liquid laser.....	8
1.6.3 Solid laser.....	9
1.6.4 Semiconductor (Diode) laser.....	10
1.7 Laser matter interaction.....	11
1.7.1 Reflection and Refraction.....	12
1.7.2 Absorption.....	13
1.7.3 Scattering.....	14

1.8 Optical properties of matter.....	16
1.9 Teeth fillings .....	16
1.10 Commonly materials for direct tooth restorations.....	20
1.10.1 Composite (resin).....	20
1.10.2 Amalgam.....	21
1.11 The health effects of dental amalgam.....	21
1.12 Restoration longevity.....	22
1.13 Hardness testing.....	23
1.14 Literature review.....	24

## **Chapter Two**

### **The Experimental Part**

2.1 Introduction.....	27
2.2 The diode laser.....	27
2.3 Rockwell hardness tester .....	28
2.4 Amalgam material.....	28
2.5 Amalgamator.....	29
2.6 The experimental procedure.....	30

## **Chapter Three**

### **Results and Discussion**

3.1 Introduction.....	34
3.2 The Results .....	34
3.3 The hardness enhancement of laser ( $\Delta H$ ).....	37

3.4 Discussion.....	37
3.5 Conclusions.....	38
3.6 Recommendations.....	39
References.....	40

## **List of Tables**

<b>Table1-1.</b> Advantages and disadvantages of different types of restorative material.....	17
<b>Table1-2.</b> Annual failure rates of dental restorations.....	23
<b>Table2-1.</b> Specifications of amalgamator model.....	30
<b>Table 3-1.</b> Hardness values of amalgam before and after irradiation by diode laser measured at different times.....	34
<b>Table 3-2.</b> The percentage of hardness differences between the two group....	35

## List of Figures



<b>Figure1.1.</b> Basic geometry of a helium-neon laser system .....	7
<b>Figure 1.2.</b> Basic geometry of Ruby laser system.....	9
<b>Figure 1.3.</b> Basic geometry of semiconductor laser system.....	11
<b>Figure 1.4.</b> Geometry of reflection, refraction, absorption and scattering...	11
<b>Figure 1.5.</b> Geometry of specular reflection and refraction.....	12
<b>Figure 1.6.</b> Geometry of Rayleigh scattering.....	15
<b>Figure2.1.</b> The diode laser device .....	27
<b>Figure2.2.</b> Rockwell hardness tester model TH160.....	28
<b>Figure 2.3.</b> Amalgam capsules package.....	29
<b>Figure2.4.</b> Amalgam meter devise.....	30
<b>Figure 2.5.</b> Amalgam sample after preparation.....	31
<b>Figure 2.6.</b> Block diagram of the setups used in this work.....	32
<b>Figure 2.7.</b> The hardness test for samples.....	33
<b>Figure3.1.</b> The hardness of samples before and after irradiation by diode laser after different time intervals.....	35
<b>Figure3.2.</b> Acomparision between effect of the two lasers on amalgam after the same time intervals.....	36
<b>Figure 3.3.</b> Enhancement of the amalgam hardness irradiated by diode laser 671 nm and power of 100 mW.....	37

## **Abstract**

In this study, human teeth filler (Amalgam) hardness was enhanced using Low Level Laser. The amalgam samples were prepared by amalgamator

device and irradiated for 30 seconds by diode laser with wavelength of 671 nm and power of 100 mW. The hardness was measured at different time intervals (2 hr, 6 hr, 12 hr, 18 hr and 24hr) using a Rockwell hardness tester. Other sample form the same amalgam was prepared without irradiation. The irradiated samples showed a significant increase in their hardness compared to the non-irradiated samples. The irradiated sample need only 6 hours to reach the same degree of hardness of the non-irradiated sample which takes 24 hours. The results showed that the laser irradiated samples undergo re-crystallization and therefore become more hardness than the non-irradiated samples.

## المستخلص

في هذا البحث تم زيادة الصلابة لحشوات الاسنان (الأملمغم) في فترة زمنية قصيرة عن طريق تشعيها بليزر نو قدرة واطئه. تم تجهيز العينات وخلطها بجهاز الاملمغميتر وتشعيع العينة لمدة 30 ثانية بالليزر الثنائي نو الطول الموجي 671 نانومتر وقدرة 100 ملي واط وقيست الصلابة في فترات زمنية مختلفة (2 ساعة, 6 ساعة, 12 ساعة, 18 ساعة, 24 ساعة) باستخدام جهاز روكويل لقياس الصلابة. تم إعداد عينه ثانيه من نفس الاملمغم ولكن دون تشعيع. أظهرت العينات المشععة زيادة كبيرة في صلابتها مقارنة مع العينات الغير مشععة. العينات المشععة بالليزر إحتاجت فقط الى 6 ساعات لتصل نفس درجة صلابة العينات الغير مشععة بعد 24 ساعة. بينت النتائج أن العينات المشععة بالليزر يحدث لها إعادة بلورة ولذلك تصيح اكثر صلابة من العينات الغير مشععة.